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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/580,485	05/30/2000	Shunpei Yamazaki	0756-2154	1593

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EXAMINER	
SARKAR, ASOK K	
ART UNIT	**PAPER NUMBER**
2813	16

DATE MAILED: 12/05/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/580,485	YAMAZAKI ET AL.	
	Examiner	Art Unit	
	Asok K. Sarkar	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2001* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *6 and 24-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-23 and 30-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to because of the following informalities: In line two "between" should be inserted after formed. Appropriate correction is required.

Response to Arguments

2. Applicant's arguments with respect to claims 1 – 5, 7 – 23 and 30 - 35 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 2, 8, 13, 15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Hattori, US 5,889,459.

Regarding claims 1, 2, 8, 13, 15 and 19, Tang discloses a method of forming TFT-EL display panel using organic electroluminiscent media (see Title) where they disclose:

- forming at least a TFT over an insulating substrate 41 with respect to Figs. 2 and 8;
- forming an insulating film 52 over the TFT with respect to Figs 7 and 8 in column 7, lines 26 – 27;
- forming a pixel electrode 72 over the insulating film 52 and the electrode 72 is connected to the TFT (see Fig. 3) in column 7, lines 16 –25;

- forming an organic EL layer 82 over the pixel electrode in column 7, line 42;
- forming a second electrode 84 over the EL layer (see Fig. 3) in column 9, line 60.

Tang discloses the formation of the EL layer by vapor deposition and suggests that other conventional techniques can be used in column 8, lines 8 – 11. Tang also teaches that the insulating material 52 is preferably silicon dioxide (see column 7, lines 14 – 15) suggesting that other types of insulators can also be used.

Tang fails to disclose that the EL layer is selectively formed through an ink jet method corresponding to each of the plurality of pixel electrodes. Tang also fails to teach that the insulating film is capable of preventing penetration of an alkali metal 9functional limitation).

Kurosawa teaches selective formation of EL layer corresponding to each pixel electrode by an ink jet method in column 7, lines 13 – 19 and in column 15, lines 42.

Tang and Kurosawa fail to teach that the insulating film is capable of preventing penetration of alkali metal.

Hattori teaches that metal oxide insulating films such as silicon oxide and aluminum oxide can prevent the alkali ion diffusion in column 5, lines 33 – 37.

Hattori fail to teach using the insulating films with a semiconductor device but fails to expressly disclose TFTs.

However, given the substantial teaching of Tang in view of Kurosawa and Hattori, it would have been obvious to one with ordinary skill in the art at the time of the

invention to modify Tang's method by depositing the EL layer by inkjet method since depositing EL layer by the inkjet method will be far less expensive. Use of metal oxide insulating films such as silicon oxide and aluminum oxide in Tang's device will prevent the alkali ion diffusion because of the inherent properties of these well known oxides as taught by Hattori.

5. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Ogura, JP 07,014,678 A.

Ogura teaches insulating silicon nitride film (see English Abstract).

Therefore, given the substantial teaching of Tang in view of Kurosawa and Ogura, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by forming the insulating film of silicon nitride.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Aisenberg, US 4,530,750.

Tang teaches forming the TFT, insulator, pixel electrodes and the organic EL layers on the pixel electrodes as described above with respect to claims 1 and 2.

Tang teaches silicon oxide as the preferred insulator and fails expressly to teach insulating layer of diamond like carbon.

Kurosawa teaches inkjet printing method of forming the EL layer as described earlier with respect to claims 1 and 2.

Tang and Kurosawa fail to teach that the insulating film is capable of preventing penetration of alkali metal.

Aisenberg teaches that insulating diamond like carbon has a densely packed structure capable of preventing penetration of large alkali ions in column 9, lines 25 - 30.

Aisenberg fails to teach using the insulating films with TFTs.

However, given the substantial teaching of Tang in view of Kurosawa and Aisenberg, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by depositing the EL layer by inkjet method since depositing EL layer by the inkjet method will be far less expensive. Use of insulating film of diamond like carbon in Tang's device will prevent the alkali ion diffusion because of the inherent properties of these well known oxides as taught by Aisenberg.

7. Claims 4, 5, 38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647, Ogura, JP 07,014,678 A and Poppal, US 6,283,578.

Tang teaches forming the TFT, insulator, pixel electrodes and the organic EL layers on the pixel electrodes as described above with respect to claims 1 and 2.

Tang teaches silicon oxide as the preferred insulator.

Tang fails to expressly inkjet printing method of forming the EL layer in nitrogen containing atmosphere and the insulating film is capable of preventing penetration of alkali metal.

Kurosawa teaches inkjet printing method of forming the EL layer as described earlier with respect to claims 1 and 2. They fail to expressly teach forming the EL layer through an ink jet method in nitrogen containing atmosphere.

Kurosawada fail to teach that the insulating film is capable of preventing penetration of alkali metal.

Ogura teaches that both Si_3N_4 and SiO_2 can be used as ion barriers for alkali ion diffusion to provide EL element with high reliability (see English abstract).

Poppal teaches that nitrogen can be passed through ink jet printing head to prevent clogging.

Poppal fails to expressly teach that ink jet printing can be done in dry nitrogen, argon or dry argon atmosphere.

Ogura and Poppal fail to teach using the insulating films with TFTs.

However, given the substantial teaching of Tang in view of Kurosawa, Ogura and Poppal, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by depositing the EL layer by inkjet method with dry nitrogen or other inert gas such as dry argon passing through the head (to prevent head clogging) as taught by Poppal since depositing EL layer by the inkjet method will be far less expensive. The envelop of dry nitrogen or argon atmosphere will also protect the organic EL layers from oxidation and hydrolysis by oxygen and moisture since these organic dyes are very prone to oxidation in air and hydrolysis in the presence of moisture. Use of insulating film of silica in Tang's device will prevent the alkali ion diffusion because of the inherent properties of these well known oxides as taught by Ogura.

8. Claims 7 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Hattori, US 5,889,459 as applied to claims 1 and 2 above, and further in view of Kim, US 6,100,954.

Tang in view of Kurosawa and Hattori do not teach the forming of an organic resin between the TFT and the insulating film.

Kim discloses a method of forming a liquid crystal display with organic planarization layer where they teach forming an insulating layer comprising an organic layer 159 with respect to Figs 15A – 15G and 16A to 16G and an inorganic insulating layer 181 on the on the organic layer 159 in column 19, lines 42 - 65. They teach insulating films of SiO_2 and Si_3N_4 in column 12, lines 10 – 20.

Therefore, given the substantial teaching of Tang in view of Kurosawa and Hattori, and further in view of Kim, it would have been obvious to one with ordinary skill in the art at the time of the invention to use insulating film comprising an organic resin and an insulating layer capable of preventing the penetration of an alkaline metal on the organic resin film.

9. Claims 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Hattori, US 5,889,459 as applied to claims 1 and 2 above, and further in view of Shimoda, SID 99 Digest, p 376 – 379.

Tang in view of Kurosawa and Hattori do not teach the inkjet method using piezo element.

Shimoda in a published article titled "Multicolor Pixel patterning of Light-Emitting Polymers by Ink-Jet Printing" teaches the inkjet method using piezo element in Table 1 in page 377, column 1 under the heading "Ink-Jet machine".

Therefore, given the substantial teaching of Tang in view of Kurosawa and Hattori, and further in view of Shimoda, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang et al.'s method by depositing the EL layers by inkjet method using a piezo element.

10. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647, Ogura, JP 07,014,678 A and Poppal, US 6,283,578as applied to claims 4 and 5 above, and further in view of Kim, US 6,100,954.

Tang in view of Kurosawa, Ogura and Poppal do not teach the forming of an organic resin between the TFT and the insulating film.

Kim discloses a method of forming a liquid crystal display with organic planarization layer where they teach forming an insulating layer comprising an organic layer 159 with respect to Figs 15A – 15G and 16A to 16G and an inorganic insulating layer 181 on the on the organic layer 159 in column 19, lines 42 - 65. The insulating films of SiO_2 and Si_3N_4 are taught by them in column 12, lines 10 – 20.

Therefore, given the substantial teaching of Tang in view of Kurosawa, Ogura and Poppal, and further in view of Kim, it would have been obvious to one with ordinary skill in the art at the time of the invention to use insulating film comprising an organic

resin and an insulating layer capable of preventing the penetration of an alkaline metal on the organic resin film.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Aisenberg, US 4,530,750 as applied to claim 3 above, and further in view of Shimoda, SID 99 Digest, p 376 – 379.

Tang in view of Kurosawa and Aisenberg do not teach the inkjet method using piezo element.

Shimoda in a published article titled "Multicolor Pixel patterning of Light-Emitting Polymers by Ink-Jet Printing" teaches the inkjet method using piezo element in Table 1 in page 377, column 1 under the heading "Ink-Jet machine".

Therefore, given the substantial teaching of Tang in view of Kurosawa and Aisenberg and further in view of Shimoda, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang et al.'s method by depositing the EL layers by inkjet method using a piezo element.

12. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647, Ogura, JP 07,014,678 A and Poppal, US 6,283,578 as applied to claims 4 and 5 above, and further in view of Shimoda, SID 99 Digest, p 376 – 379.

Tang in view of Kurosawa, Ogura and Poppal do not teach the inkjet method using piezo element.

Shimoda in a published article titled "Multicolor Pixel patterning of Light-Emitting Polymers by Ink-Jet Printing" teaches the inkjet method using piezo element in Table 1 in page 377, column 1 under the heading "Ink-Jet machine".

Therefore, given the substantial teaching of Tang in view of Kurosawa, Ogura and Poppal and further in view of Shimoda, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang et al.'s method by depositing the EL layers by inkjet method using a piezo element.

13. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647, Ogura, JP 07,014,678 A and Poppal, US 6,283,578 as applied to claim 5 above, and further in view of Nagao, JP 60,228,821.

Tang in view of Kurosawa, Ogura and Poppal do not teach the insulating film comprising an element such as B, C, N, Al, Si and also comprises Si, Al, N, O and M where M is Ce, Yb, Sm, Er, Y, La, Gd, Dy and Nd.

Nagao teaches an antiwear protective film having excellent alkali resistance where the insulating film comprises an element such as B, C, N, Al, Si and also comprises Si, Al, N, O and M where M is Ce, Yb, Sm, Er, Y, La, Gd, Dy and Nd (see the English Abstract).

Therefore, given the substantial teaching of Tang in view of Kurosawa, Ogura and Poppal and further in view of Nagao, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by forming

the insulating film comprising an element such as B, C, N, Al, Si and also comprises Si, Al, N, O and M where M is Ce, Yb, Sm, Er, Y, La, Gd, Dy and Nd.

14. Claims 30 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Hattori, US 5,889,459 as applied to claims 1 and 2 above, and further in view of Kobayashi, US 5,680,185.

Tang in view of Kurosawa and Hattori do not teach forming one of the pixel electrodes comprising one selected from the group of mg, Li, Cs, Ba, K, Be and Ca.

Kobayashi teaches forming TFT devices in which the pixel electrodes are made of Al-Mg alloy in column 17, lines 32 – 33.

Therefore, given the substantial teaching of Tang in view of Kurosawa and Hattori and further in view of Kobayashi, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by forming the pixel electrode containing Mg.

15. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 Kurosawa, US 6,057,647 and Hattori, US 5,889,459 as applied to claim 2 above, and further in view of Nagao, JP 60,228,821.

Tang in view of Kurosawa and Hattori do not teach the insulating film comprising of aluminum nitride.

Nagao teaches an antiwear protective film having excellent alkali resistance where the insulating film comprises an element such as B, C, N, Al, Si and also comprises Si, Al, N, O and M where M is Ce, Yb, Sm, Er, Y, La, Gd, Dy and Nd (see the English Abstract).

Therefore, given the substantial teaching of Tang in view of Kurosawa and Hattori and further in view of Nagao, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by replacing the silicon dioxide insulator with aluminum nitride.

16. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Aisenberg, US 4,530,750 as applied to claim 3 above, and further in view of Kim, US 6,100,954.

Tang in view of Kurosawa and Aisenberg do not teach the forming of an organic resin between the TFT and the insulating film.

Kim discloses a method of forming a liquid crystal display with organic planarization layer where they teach forming an insulating layer comprising an organic layer 159 with respect to Figs 15A – 15G and 16A to 16G and an inorganic insulating layer 181 on the on the organic layer 159 in column 19, lines 42 - 65. The insulating films of SiO_2 and Si_3N_4 are taught by them in column 12, lines 10 – 20.

Therefore, given the substantial teaching of Tang in view of Kurosawa and Aisenberg, and further in view of Kim, it would have been obvious to one with ordinary skill in the art at the time of the invention to use insulating film comprising an organic resin and an insulating layer capable of preventing the penetration of an alkaline metal on the organic resin film.

17. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647 and Aisenberg, US 4,530,750 as applied to claim 3 above, and further in view of Kobayashi, US 5,680,185.

Tang in view of Kurosawa and Aisenberg do not teach forming one of the pixel electrodes comprising one selected from the group of mg, Li, Cs, Ba, K, Be and Ca.

Kobayashi teaches forming TFT devices in which the pixel electrodes are made of Al-Mg alloy in column 17, lines 32 – 33.

Therefore, given the substantial teaching of Tang in view of Kurosawa and Aisenberg and further in view of Kobayashi, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by forming the pixel electrode containing Mg.

18. Claims 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, US 5,684,365 in view of Kurosawa, US 6,057,647, Ogura, JP 07,014,678 A and Poppal, US 6,283,578 as applied to claims 4 and 5 above, and further in view of Kobayashi, US 5,680,185.

Tang in view of Kurosawa, Ogura and Poppal do not teach forming one of the pixel electrodes comprising one selected from the group of mg, Li, Cs, Ba, K, Be and Ca.

Kobayashi teaches forming TFT devices in which the pixel electrodes are made of Al-Mg alloy in column 17, lines 32 – 33.

Therefore, given the substantial teaching of Tang in view of Kurosawa, Ogura and Poppal and further in view of Kobayashi, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Tang's method by forming the pixel electrode containing Mg.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 703 238 2521. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers can be reached on 703 308 2417. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308 7722 for regular communications and 703 308 7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 4918.

Asok K. Sarkar
November 15, 2001

Charles Bowers
Supervisory Patent Examiner
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